

# INDUSTRIAL COGENERATION IN EUROPE

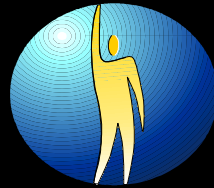
*Michel CARRESE*



# Plan

- **Elyo / Suez Lyonnaise des Eaux**
- **The status of cogeneration in Europe for Industry**
- **Cogeneration in France: the Solvay Dombasle CHP plant**





SUEZ LYONNAISE DES EAUX

# SUEZ LYONNAISE DES EAUX

**A world leader in private infrastructure services  
An industrial services group for manufacturing companies**

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# Key Figures

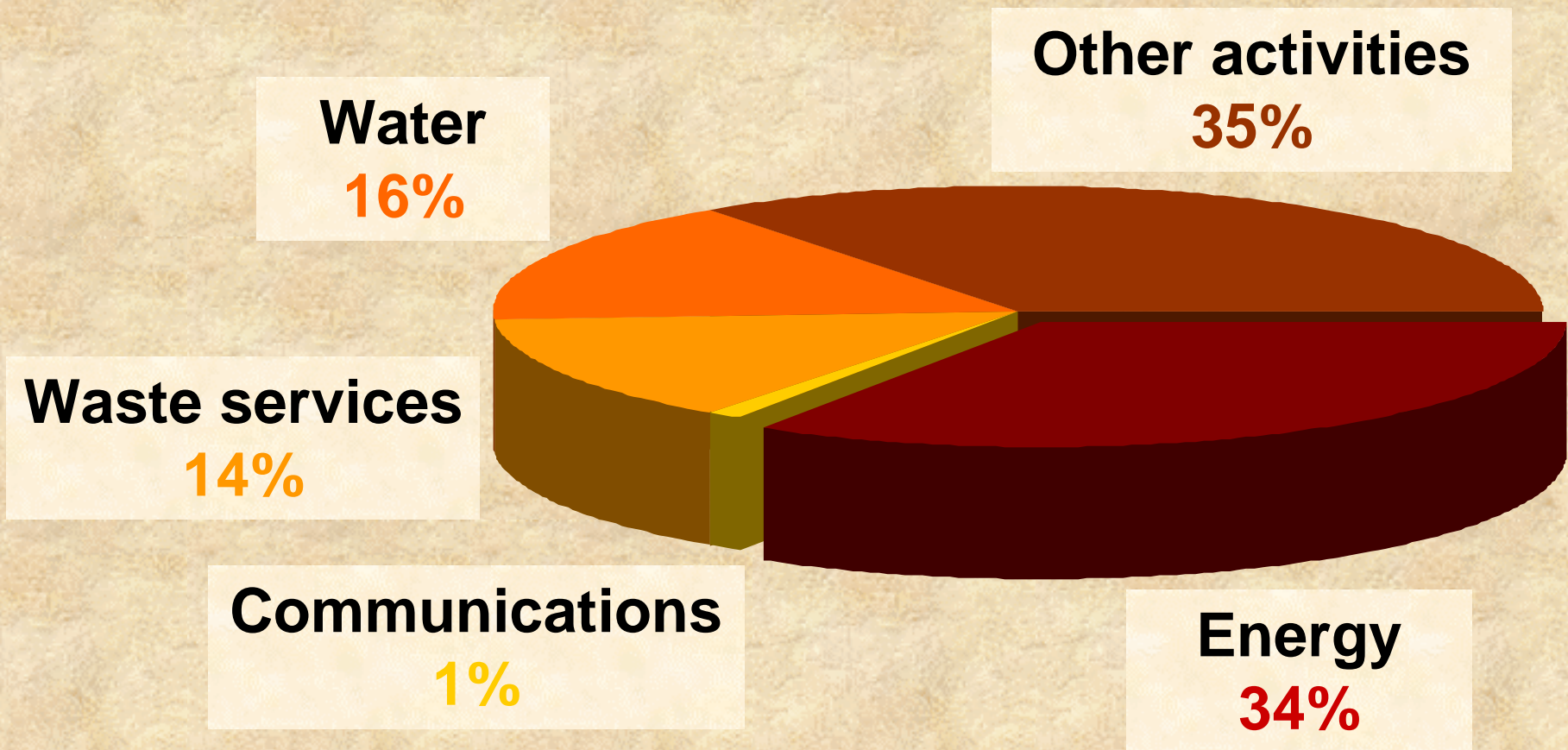
**220,000 people employed throughout the world**

**Present in over 120 countries**

	in billion	FRF	Euro/US \$
<b>Revenues</b>		<b>206</b>	<b>31.36</b>
<b>Net current income (group share)</b>		<b>5.0</b>	<b>0,76</b>
<b>Net income (group share)</b>		<b>6.6</b>	<b>1,00</b>



# 1998 revenue by business sector



# **Energy: our businesses**

**Generation, transmission and supply of electricity**

**Production, transmission and supply of gas**

**Energy trading**

**District heating and cooling systems**

**Cogeneration**

**Waste to energy**

**Management of utilities**

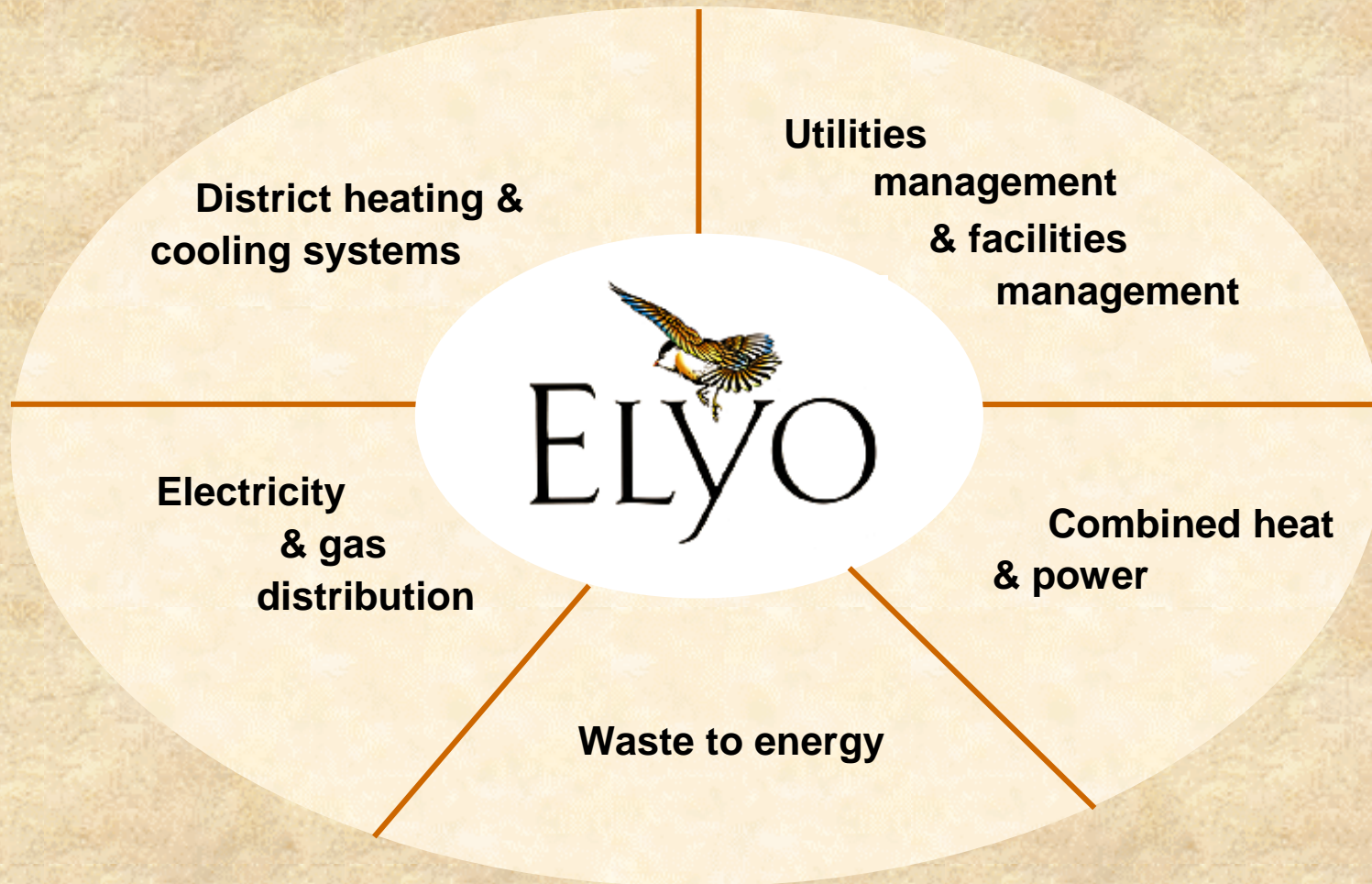
**Facilities management**



# Energy: key figures

	In billion	FRF	Euro/US \$
● 1998 revenues		70	10.77
● 1998 group net current income		1.3	0.19
● 40,000 MW <sub>e</sub>			
● 17,000 thermal MW			
● an annual gas capacity of more than 100 billion cubic meters.			

# Our business: energy management and related services





# Elyo worldwide



# **The status of cogeneration in Europe for industry**

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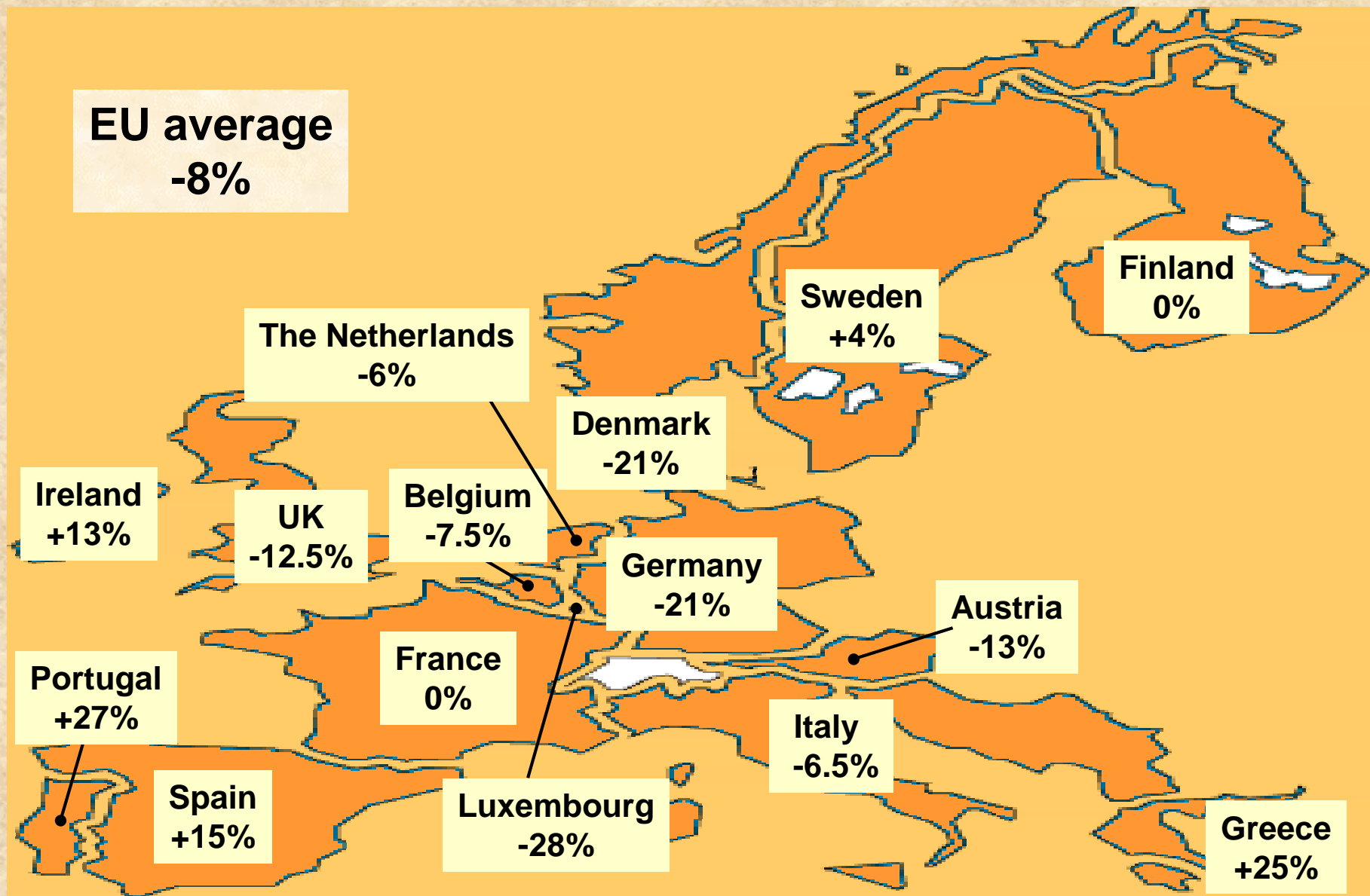
**EU climate change policies**

**Electricity and gas deregulation**

**Outsourcing of industrial utilities**



# European Union Kyoto targets



# EU climate change policy

**The Commission identified cogeneration as the energy application that can make the single biggest contribution to achieve EU climate goals**

CHP as a share of EU electricity production in 2010	CO <sub>2</sub> savings (Mt CO <sub>2</sub> )	% of former EU target
30	221	46
25	158	32
21	104	22
18	68	14



# **EU climate change policy**

## **Cogeneration share of electricity production**

**9% in 1995**

**18% in 2010**

## **Installed cogeneration capacity**

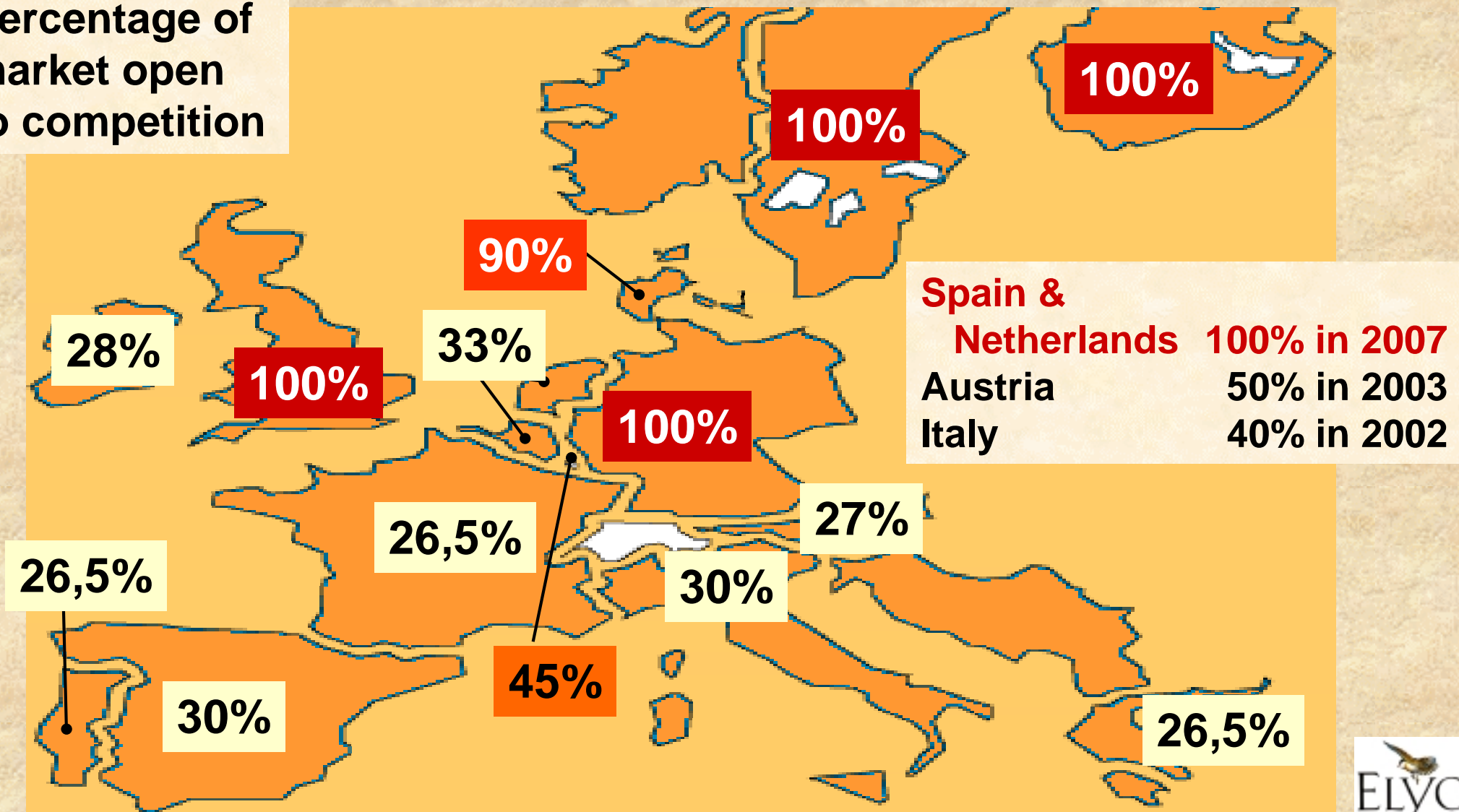
**from 66 GWe to 130 GWe or more**

## **Development of an action plan**

**Excellent opportunity for all players**






# Degree of market opening


Percentage of  
market open  
to competition





# Eligible customers

-  All customers
-  End users > 15 GWh/an
-  End users > 30 GWh/an
-  End users > 40 GWh/an
-  End users > 100 GWh/an

 Industrial customers > 2 MW  
and distribution systems  
operators



# Conclusions

**CHP is still the perfect tool for clean decentralized energy and energy services**

**Uncertainties remain but, if in the right framework, liberalization should have a positive impact**

**The potential for industrial cogeneration is not over**

**There is a large potential for district heating cogeneration in eastern countries**

**Small cogeneration = the future market?**



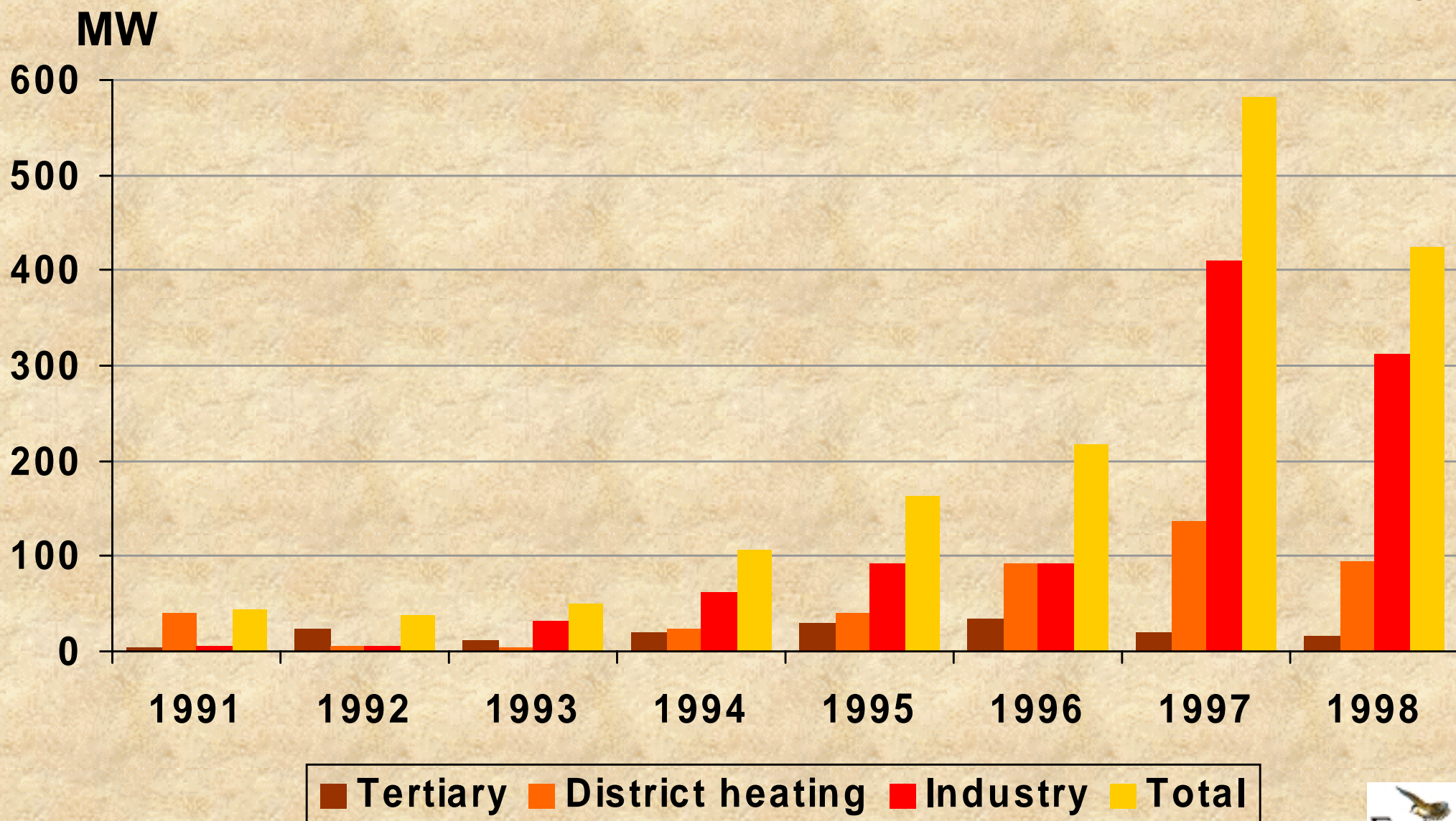
# **France: probably the best European market in 1997/98**

**One of the most centralized countries (nuclear) but no longer the worst country for cogeneration**

**A standard, 12-year buy-back contract with the utility**

**Most of the new development is in the industry and district heating systems**

# Cogeneration in France





# The Solvay Dombasle cogeneration plant

- Combined heat and power
- System capacity     $45 \text{ MW}_e$   
                               $44 \text{ MW}_{th}$
- Total investment     $140 \text{ MF}$   
                               $(23.3 \text{ M US \$})$
- Production
  - ▶ electricity             $350 \text{ GWh/year}$
  - ▶ steam                  $400,000 \text{ tons/year}$
- CHP efficiency         $80\%$
- Duration of construction: 16 months



# **Solvay group**

**4 fields of activity:**

**chemicals  
plastics**

**transformation  
pharmaceutics**

**International group, based in Belgium, present, with  
35,000 persons, in 46 countries and in constant  
expansion**

**1997 turnover US \$ 7.5 billions**

**Important growth in recent years**

**Announced goals of increased growth through  
innovation and competitiveness**



# **The Solvay Dombasle cogeneration plant**

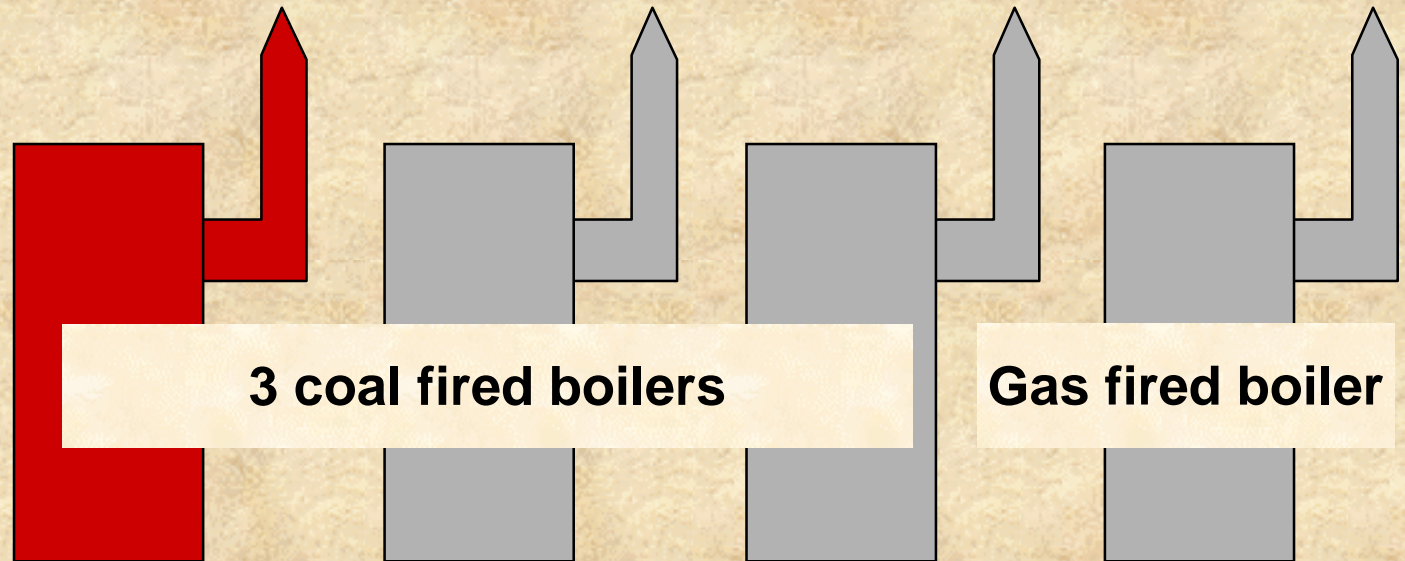
**Reducing energy costs, one of the components of improving competitiveness**

**Environment, one of the Solvay's group priorities for innovation**

**CHP on production sites contributes significantly to these 2 privileged goals**

# Basic design

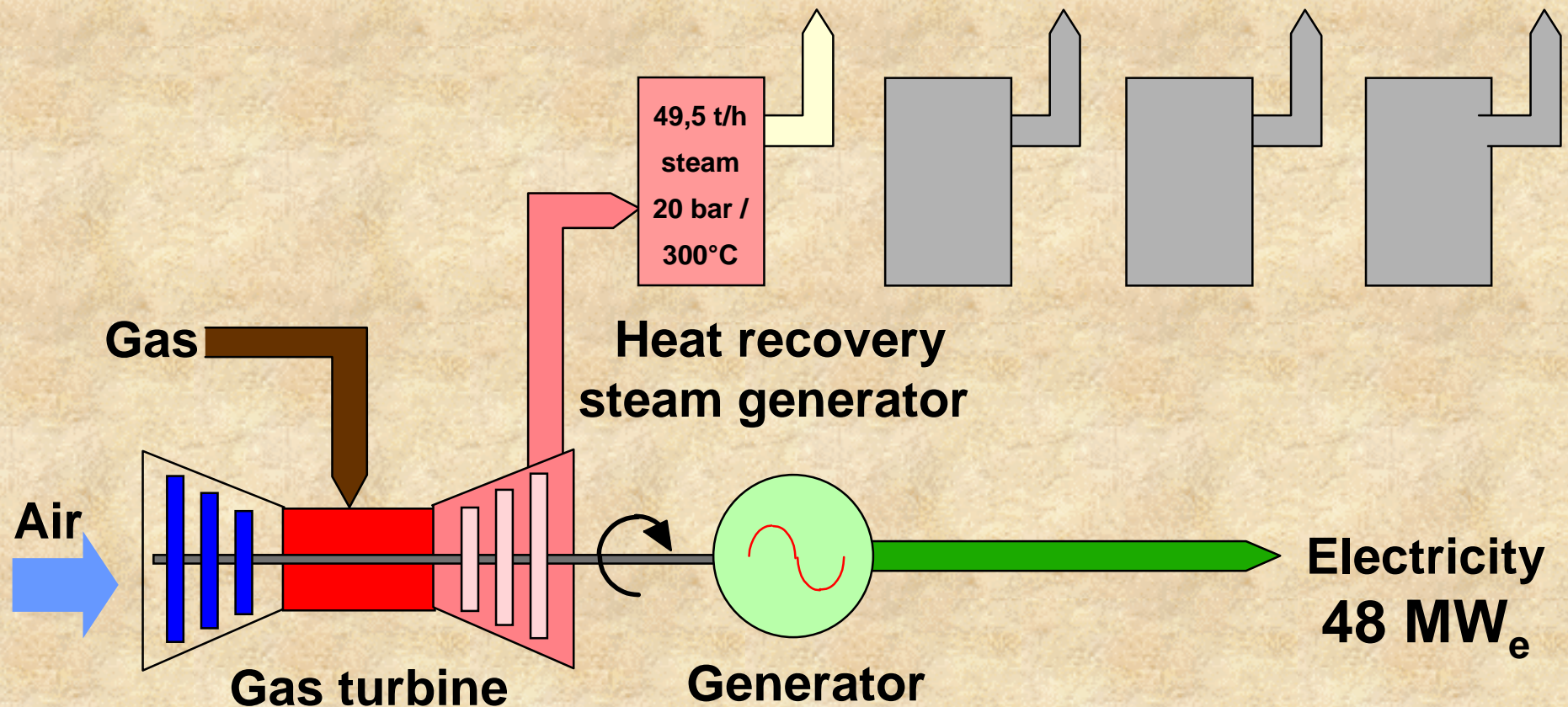
**Old inefficient  
boiler unable  
to comply with  
new stack  
emissions  
requirements**



**Production = 1 600 000 tons/year**



# Basic design



## Annual production

Electricity	350 GWh
Steam	400,000 tons

# Reduction of polluting agents resulting from the replacement of one boiler

The table below summarizes the reduction in polluting agents resulting from the replacement of one of the boilers by cogeneration, the 3 others remaining unchanged

Dust	Sulfur oxides	Nitrogen oxides	Hydrochloric acid
28%	26%	unchanged	15%



# **The Solvay Dombasle cogeneration plant**

## **New services to the industries**

**12-year long term steam selling**

**The operator takes over full responsibility for:**

**designing the system**

**financing**

**management of construction**

**operation and maintenance**

**selling electricity to EDF's grid**

**buying gas**

**Taking over the management of other utilities**

**utilities management**